Institute for Empirical Research in Economics
University of Zurich

Working Paper Series
ISSN 1424-0459

Working Paper No. 318

Discrimination and In-group Favoritism in a Citywide Trust Experiment

Armin Falk and Christian Zehnder

April 2007

Discrimination and In-group Favoritism in a Citywide Trust Experiment*

Armin Falk and Christian Zehnder†

April 2007

Abstract

This paper provides field experimental evidence on the prevalence and determinants of discrimination and in-group favoritism in trust decisions. We observe choices of about 1,000 inhabitants of the city of Zurich who take part in a sequential trust game, in which first movers can condition their investments on the residential districts of second movers. Our main results can be summarized as follows: First movers discriminate significantly in their investment choices, i.e., strangers receive different investments depending on the district they live in. The systematics of the discrimination pattern is underlined by data from an additional newspaper study, where participants correctly guessed the outcome of the study. In terms of district characteristics two factors seem to be key for a district's reputation: while expected trustworthiness of a district increases in the socio-economic status it decreases in the degree of ethnic heterogeneity. Observed discrimination is not just based on mistaken stereotypes but can at least partly be classified as statistical discrimination. This can be inferred from the fact that, on a district level, both expected return on investment and actual investments are positively correlated with actual back transfers. First movers correctly anticipate different levels of trustworthiness and discriminate accordingly. Furthermore, we provide evidence of in-group favoritism, i.e., people trust strangers from their own district significantly more than strangers from other districts. Finally, we discuss individual determinants of discrimination and in-group favoritism.

JEL-Classifications: C90, D63

Keywords: Discrimination, In-group Favoritism, Trust, Trustworthiness, Reciprocity, Social Capital, City Development

*Financial support by the Research Committee and the Young Academics Support Committee of the University of Zurich is gratefully acknowledged. We thank the Statistical Office of Zurich for very valuable support. We also like to thank seminar participants at Caltech, ENABLE Workshop (Fraueninsel), Mac Arthur Research Network Workshop (Philadelphia), University of Southern California, University of Chicago and University of Munich.

†Armin Falk: IZA and University of Bonn, Schaumburg-Lippe-Strasse 7/9, D-53113 Bonn, falk@iza.org; Christian Zehnder: Institute for Empirical Research in Economics, University of Zurich, Bluemlisalpstrasse 10, CH-8006 Zurich, zehnder@iew.unizh.ch.

1 Introduction

Trust is an elementary component of social and economic life. It is therefore not surprising that economists have accumulated a large body of evidence on the existence and economic consequences of trust using field data, experiments and surveys. Surprisingly little is known, however, about whether people discriminate in their trust and if so, what determines whether they trust strangers from a particular group more than members from another group. We also know little about whether trust discrimination is based on stereotypes or actual differences in trustworthiness and what determines trust discrimination at the individual level.

We address these questions with the help of a field experiment conducted among roughly 1,000 inhabitants of the city of Zurich. The experimental game is a variant of the so-called trust or investment game.[1] In this sequential two-player game first movers send money to second movers, which is tripled by the experimenters. Second movers then decide how much to return. The amounts sent and returned inform us about the levels of trust and trustworthiness, respectively. Studying trust discrimination requires a social environment that defines distinct groups. In our study these groups are defined by the 12 districts of the city of Zurich. We think that districts of a city are a well-suited environment to study trust discrimination: districts are natural geographic entities, have a social meaning and are sufficiently heterogenous to potentially justify different reputations with respect to trust and trustworthiness. Moreover, district affiliation is relevant in every day transactions, which means that investments observed in the experiment can be interpreted as a proxy for efficiency enhancing and trust-related decisions taken every day, such as car repair or hiring and moving decisions.

First movers in the experiment made a contingent decision: before knowing the residential district of their second mover they had to decide on an investment decision for each of the 12 districts, including their own district. This design feature allows us to study discrimination in a straightforward way, simply by comparing the amounts sent into the different districts. First movers were also asked about expected back transfers for each investment. Second mover decisions were elicited with the help of the contingent respond method, which enables us to measure actual trustworthiness of the inhabitants of different districts.

Our data on the choices of first and second movers are complemented by socioeconomic and individual background information about all participants. The data come from two sources, the statistical office of Zurich and a questionnaire that each participant in the

[1] This game was introduced by Berg et al. (1995).

experiment had to complete. We also use statistical information about the districts and data from an additional newspaper experiment we conducted in collaboration with a large daily newspaper in the Zurich area. In this experiment we asked newspaper readers from Zurich, who were informed about the rules of the experiment, to predict the outcome of the study. In particular they had to indicate the two districts that they thought would receive the lowest investments and the two districts that would receive the highest investments. To guarantee incentive compatibility we paid three randomly chosen readers among those whose answers were correct a prize of CHF 200. The results of our newspaper study provide a robustness check for our main experiment. If the newspaper readers predict the participants' choices correctly, we have additional evidence that the discrimination pattern in our experiment is systematic.

Our main findings can be summarized as follows. First, we investigate the prevalence of trust discrimination. We find that investment levels differ systematically across the residential districts of second movers, i.e., many first movers discriminate. Across districts first movers expect very different returns on investment and invest accordingly. The systematics of the discrimination pattern is supported by the results of our newspaper study. The readers predict which districts receive the highest and lowest investments extremely well. This underlines that beliefs about the districts' different reputations are commonly shared. In terms of district characteristics that determine a trustworthy reputation, two factors are key: socioeconomic status and ethnic heterogeneity. The higher the economic status and the lower the ethnic heterogeneity, the higher is the reputation of a particular district, i.e., the higher is the expectation that a stranger from this district is actually trustworthy.

Second, we explore the nature of the discrimination process. It turns out that observed discrimination is at least in part statistical in nature. This can be inferred from the fact that – on a district level – both expected return on investment as well as investments are positively and significantly correlated with actual trustworthiness. In other words, first movers correctly anticipate different levels of trustworthiness and discriminate on the basis of this belief.

In a third step, we explore in-group favoritism, which is a particular form of discrimination, where people tend to favor members of their own group. We show that first movers invest significantly higher amounts to strangers who belong to their own district, compared to strangers from other districts. This in-group bias is not just taste driven as our data on expected back transfers reveals: first movers not only send more money, they also believe that fellow citizens from their own district are more trustworthy than strangers from other districts.

In a final step of the analysis we turn to the individual determinants of discrimination. We classify people who invest different amounts into different districts as discriminators and show that better educated people as well as people who have children discriminate less, while older people as well as people who favor right wing parties discriminate more. Turning to individual determinants of in-group favoritism we find that in-group favoritism is not significantly correlated with individual characteristics, such as gender or age. The only variable that significantly explains different levels of in-group favoritism is the degree to which people feel closely associated with their own district.

Our paper offers several contributions to the literature. First, to the best of our knowledge, it is the first to document trust discrimination based on residential districts, i.e., on a community level.[2] This type of discrimination is particular important in light of the fact that trust and trustworthiness constitute central components of a community's social capital (see, e.g., the definitions in Loury, 1977; Coleman, 1990; Putnam, 2000), which influences a wide range of important economic phenomena, such as governmental and judicial efficiency (Putnam et al., 1993; La Porta et al., 1997), financial development and volume of trade (Guiso et al., 2004) or the rate of overall economic growth (Knack and Keefer, 1997; Knack and Zak, 2001). In this sense trust can be seen as a sort of lubricant for economic transactions, especially if markets are imperfect and contracts remain incomplete.[3]

Second, our results show that trust discrimination can be the result of statistical discrimination: first movers have relatively accurate expectations about districts' trustworthiness and invest more in districts that are actually more trustworthy. This is different to previous studies where discrimination has not been statistical in nature. Fershtman and Gneezy (2001), e.g., investigated gender and race effects in a trust game played between Ashkenazic and Eastern Jews from two Universities in Israel. While there is no evidence for ethnic discrimination to and by women, male subjects exhibit a significant discrimination pattern, transferring less money to Eastern males than to Ashkenazic males. Different to our findings, however, this discrimination is not statistical but turns out to be the consequence of largely mistaken stereotypes.

Third, our findings shed new light on the controversial issue of in-group favoritism. Starting with the famous "Robber's Cave Experiment" by Sherif et al. (1961) many experiments in psychology have demonstrated the presence of in-group favoritism even if

[2]Previous studies on discrimination have predominantly focused on ethnic or gender discrimination, starting with the seminal paper by Fershtman and Gneezy (2001), who investigated gender and race effects in a trust game played between Ashkenazic and Eastern Jews from two Universities in Israel.

[3]In a famous quote Kenneth Arrow notes: "Virtually every commercial transaction has within itself an element of trust...", see Arrow (1972), p. 357.

group affiliations are created artificially (see Yamagishi et al., 1999, for a survey of this literature). In recent years many economists have become interested in the phenomenon of in-group favoritism in trust decisions. Interestingly, the present state of the literature is fairly mixed. In experiments conducted on the basis of the minimal group paradigm the evidence in favor of an in-group bias is very weak (see e.g., Buchan et al., forthcoming; Güth et al., 2005). But also studies based on naturally defined groups provide ambiguous evidence. While a number of studies find no or only weak evidence for in-group favoritism (see, e.g., Fershtman and Gneezy, 2001; Glaeser et al., 2000; Bouckaert and Dhaene, 2004; Haile et al., 2006), there are two studies which report a significant in-group bias in trust decisions (see, Bernhard et al., 2006; Götte et al., 2006).

We contribute to the emerging literature on in-group favoritism in several ways. First, we show that in the context of city districts in-group favoritism is relevant in naturally occurring groups. Subjects in our study use their experience from every day life to determine how much they trust inhabitants from different parts of the city they live in. Second, we do not only document the existence of in-group favoritism but we are also able to explain at least part of it with subjects' beliefs. Investments to the own district are not only higher because of taste but also reflect the fact that people expect higher returns on investments in their own district.

Finally, we contribute to the existing literature by studying individual determinants that are driving trust discrimination and in-group favoritism. Our large and heterogenous non-student subject pool allows us to do this in a meaningful way.

The remainder of the paper is organized as follows: in the next section we describe the design and the used background information. In section 3 we present our results. Section 4 summarizes and concludes the paper.

2 Design and Background Information

In this section we first describe the details of the trust experiment and the questionnaire subjects had to complete. We then discuss the design of the complementary newspaper study. Finally, we describe data provided by the statistical office of Zurich.

2.1 A Field Experiment on Trust and Discrimination

Our experimental tool to measure trust and trustworthiness is a variant of the so-called trust or investment game introduced by Berg et al. (1995). Two randomly chosen subjects constitute an interaction group. At the beginning of the experiment both subjects receive an endowment of 20 Swiss Francs (CHF 1 $\sim$ US-$ 0.8). One person is assigned the role

of the first mover, the other the one of the second mover, respectively. The first mover decides how much of his endowment to transfer to the second mover. The transfer can be any amount in steps of 2 Swiss Francs, i.e., 0, 2, 4, ..., or 20 Francs. The chosen transfer is tripled by the experimenter and passed to the second mover. Contingent upon the first mover's transfer the second mover decides on a back transfer to the first mover. This back transfer can be any integer amount between 0 and 80 Swiss Francs. Given the back transfer of the second mover incomes are determined: the first mover earns his endowment minus his own transfer plus the back transfer of the second mover. The second mover gets his endowment plus 3 times the first mover's transfer minus the back transfer.

Our design differs in important ways from previous trust experiments. Since we are mainly interested in discrimination based on group affiliation we add concrete context to the decision environment. In particular, first movers could condition their investment decision on the residential district of the second mover. When they took their decision, they did not yet know the residential district of their second mover. Therefore they had to make twelve investment decisions, one for each of the 12 districts of Zurich. First movers made their decisions with the help of a table with twelve rows (see Table 1). The first column of this table stated the following question: "*Suppose the other person lives in district ... . How much of your CHF 20 do you invest?*". In the second column first movers indicated how much they invest if the second mover lives in district 1, in district 2 etc. up to district 12. In Column (3), first movers were also asked to state their beliefs about the second movers' repayment decision for each of the twelve districts. Thus first movers made 12 investment decisions and indicated 12 beliefs, one for each district. Knowing first movers' beliefs is important as it allows us to calculate expected returns on investments and to distinguish between different motivations behind investments. We can identify, e.g., whether high investments are made in the expectation of high back transfers or simply reflect a desire to be altruistic.

The instructions also contained a map of Zurich, which displayed the district borders as well as the names of the neighborhoods in each district (see Figure 1). Notice, however, that we did not provide subjects with any statistical information concerning the districts' characteristics. Thus, any observed differentiation across districts is based on the subjects' everyday knowledge about Zurich.

The fact that first movers made multiple decisions may raise concerns about a potential experimenter demand effect. One could argue that by presenting twelve options, subjects were induced to differentiate their investment decisions biasing our results in favor of discrimination. While this is a potentially important concern we are quite confident that it does not compromise our findings. First, previous discrimination studies have

argued against a contingent elicitation procedure because it would *underestimate* the amount of discrimination, simply because subjects may not like to reveal that they are discriminating. Second, independent of the level of discrimination our method does not induce a particular pattern of discrimination. In other words, if subjects were simply induced to choose different investments in different rows, the resulting pattern would not be systematic but random. Even more important, multiple observations for each individual provide us with valuable information, which is why we chose to implement this procedure. It enables us to classify individuals as discriminators (if investments vary across districts) or non-discriminators (if investments are all the same). This classification is necessary to identify individual determinants of discrimination. The same argument can be made with respect to our interest in studying in-group favoritism: since first movers invest in all districts, including their own, we can easily identify whether first movers perceive strangers from their own district as more or less trustworthy than strangers from other districts. Moreover, we are able to study individual determinants of such an in-group favoritism.

In order to elicit second movers' willingness to reciprocate, we used the contingent response method. This means that each second mover, before knowing the actual first mover's investment, made a back transfer decision for each of the 11 possible investments (0, 2, ..., 20). Whether this method overestimates or underestimates people's willingness to reciprocate is an open question.[4] For our purpose, however, the contingent response method provides reliable information about second movers' willingness to reciprocate, which is key for calculating the level of reciprocation on a district level as well as understanding individual determinants of reciprocation. Moreover, we are not predominantly interested in the level of reciprocity but in the differences across districts, which should not be confounded by the usage of this elicitation method. Finally, since the strategy method allows for the simultaneous elicitation of first and second mover decisions it also facilitated the procedures of our experiment considerably.

Our mailing also included a questionnaire to elicit detailed information about socioeconomic and individual background of participants. In the cover letter it was emphasized that the questionnaire was part of the experiment and had to be completed. The questionnaire asked about personal attributes like gender, age, marital status, profession, nationality and number of siblings. In addition we elicited information about the personal and residential background of participants: political orientation, duration of residency in

[4]For example, Güth et al. (2001) report behavioral differences between a game where subjects played a game sequentially vs. playing the strategy method. On the other hand, Brandts and Charness (2000) and Cason and Mui (1998) report evidence indicating that the strategy method does not induce different behavior.

district and city, how closely associated subjects feel with their district and city, number of phone calls during last week, whether subjects are afraid of crime in their district and number of club memberships.

In addition to the information collected with the help of the questionnaire, we also received individual background information from the Statistical Office of Zurich. Together with the random sample of address files which we needed to run the study, we received a set of individual characteristics of the participants such as taxable income, gender, age, type of profession, religious affiliation, number of children and foreigner status. This data is of great value as it allows us to complement our questionnaire data and to verify its accuracy. The Statistical Office of Zurich also provides very detailed information about district characteristics. In the results section we use several of these characteristics, such as median per capita income, fraction of foreigners or religious background (see Table 4).

2.2 Experimental Procedures

Our subjects are a random sample of the city of Zurich, implying that our subject pool exhibits much greater variance with respect to socioeconomic and personal background than the typically used student samples. This feature of our data is a prerequisite to investigate the impact of person specific characteristics on trust, discrimination and trustworthiness in a meaningful way. For logistical reasons the experiment was conducted via mail correspondence. The Statistical Office of Zurich provided us with address files for each of the twelve city districts of Zurich. The address files constituted a random sample of the population of each district. In total 986 persons took part in the experiment (509 first movers and 477 second movers).

All potential participants received a mailing including a cover letter, detailed instructions, a decision sheet and a questionnaire. The cover letter informed subjects about the possibility to take part in a paid experiment, conducted by the University of Zurich. In order to enhance the credibility that we would actually pay subjects we added the remark that the Legal Service of the University (*Rechtsdienst*) guarantees that the study is run exactly according to the rules stated in the instructions. We also made clear to subjects that the study was run in accordance with the data protection legislation of the city of Zurich. In particular, we stated that all data will be used only for scientific purposes and not given to any third parties. Moreover, we guaranteed that data will be stored in anonymous form and that any information specific to persons will be destroyed after the data collection will be completed. We offered participants to send us an email (using a neutral University email address) or to call us, in order to answer potential questions. Only very few people made use of these options. The instructions explained the idea and

the rules of the experiment in detail. First and second movers were told that they were matched with another anonymous person who was randomly selected and lives in Zurich.

Participants had to complete the questionnaire and the decision sheet, i.e., first movers filled out the table concerning investments and beliefs and second movers filled out the table concerning back transfers. Subjects then returned the completed decision sheet to us, using a pre-stamped envelope. It was made clear in the cover letter that the decision sheets had to be returned before the end of a deadline, which was about one week after subjects had received their letter. Among all participants we randomly formed pairs. Given the district of the second mover we determined the respective investment of the first mover. Using the investment we then checked the corresponding back transfer.[5] In a second mailing all participants were informed about the outcome of the experiment, including the district of the second mover, the investment and back transfer decisions and the resulting payoffs for both players. The second mailing also contained the payments in a sealed envelope.[6]

2.3 The Newspaper Study

In order to get additional and independent information about the systematics and robustness of our discrimination results from the field experiment we ran an additional newspaper experiment. Several months after we had collected the data from our field experiment we contacted a large daily newspaper in the Zurich area, the *Tages-Anzeiger*. We decided to publish two articles in the newspaper. The first one reported in detail aims and design of the study. In particular, we explained the rules of the experiment and the fact that randomly drawn people from all districts of Zurich had taken part in the study. The first article did not mention any result, however. Instead readers were invited to take part in a quiz. They were asked to answer the following two questions: (1) *What do you think, which are the two districts that received the lowest investments?* (2) *What do you think, which are the two districts that received the highest investments?* To guarantee incentive compatibility, we promised to randomly select three readers among all those readers whose answers are correct, and to pay them 200 Swiss Francs. Readers could either email their answers or send them by postcard, within three days after the article had been published. A total of 281 readers took part. The second article appeared one week after the first one and contained the results of our field experiment and the newspaper study. Since there was much public interest in the study, the second article

[5] As there were a few more first movers than second movers, some second movers were matched twice. The payoff of these players was determined by the decisions associated with the first match.

[6] We deleted all names and address files after having sent the second mailing.

also contained an interview with the authors of the study as well as with the mayor of Zurich.

3 Results

In this section we present our results. We first investigate prevalence and determinants of trust discrimination. We then explore the nature of this discrimination process by relating the trust reputation of districts to their average level of trustworthiness. In a third step we investigate a particular form of discrimination, in-group favoritism. Finally, we identify determinants of trust discrimination and in-group favoritism on an individual level.

3.1 Discrimination

Our first result concerns the level of trust and district specific discrimination.

Result 1 (Trust and discrimination) *On average first movers reveal a relatively high willingness to trust and invest about 66 percent of their endowment. However, trust levels differ systematically across the residential districts of second movers, i.e., first movers discriminate.*

Support for Result 1 comes from Figure 2 and Tables 2 and 3. Figure 2 shows a histogram of all investment decisions of first movers.[7] The amounts invested are comparable to what has been observed in laboratory studies and reveal that the citizens of Zurich display a relatively high level of trust towards their fellow citizens. On average, first movers invest 13.16 Swiss Francs, which corresponds to 66 percent of their endowment, with a standard deviation of 7.07.

In the presence of trust discrimination we should observe that first movers send different amounts of money into different districts. Table 2 shows the average investment levels into each of the 12 districts of second movers. These investments indeed vary: the district with the lowest average investment, e.g., is district 4 while the district that received the highest investment is district 8.[8] In terms of magnitude the variation between lowest and highest investments is 11 percent. Thus, the mere fact that someone lives in a district with

[7]Since we used the strategy method to collect the decisions, each first mover made 12 investment decisions, one for each of the possible residential districts of the second mover. All these decisions are included in Figure 2.

[8]These differences at the aggregate level are the result of the investment behavior of the 55 percent of first movers who discriminate. 45 percent of first movers send the same amount into each district. In Section 3.3 we investigate discrimination at the individual level in more detail.

a low vs. a high reputation, reduces received investments by a remarkable amount. In the second row we calculate the expected return on investment $\left(= \frac{\text{expected back transfer}}{\text{investment}} - 1\right)$ for each district.[9] The resulting levels vary substantially, from 0.15 in districts 4 and 5 to 0.30 in district 1. Moreover, at the district level investments and expected returns on investment are strongly positively correlated, which suggests that different levels of investments are in fact driven by different expectations concerning the districts' levels of trustworthiness (Spearman's rho = 0.863, $p < 0.001$).[10]

Table 3 reveals that the investment differences displayed in Table 2 are significant for most district comparisons. This table reports the p-values of Wilcoxon-signed-rank tests conducted for pairs of districts. In the table districts are sorted by the level of received average investment. For example, investments into districts 4 and 12, the two districts with the lowest reputation, are not significantly different. Neither are districts 4 and 5 significantly different. However, from district 9 up to district 8, all districts received significantly higher investments than district 4. In total we find that out of the 66 possible comparisons, 51 are significant at least at the 5 percent level.[11]

How robust and systematic is the ranking of the districts' trust reputation shown in Table 2? Does it reflect a stable and commonly held perception of district reputation or is this ranking rather arbitrary? A good test for the systematics of the ranking is to ask inhabitants of Zurich and check whether they are able to predict it. This is what we did in our newspaper study. As outlined in more detail in section 2.3, we asked the readers of a large daily newspaper from Zurich to assess which are the two districts that received the lowest and highest investments, respectively. 281 readers took part in this incentive compatible study. Their answers are shown in Figure 3. The grey bars indicate the fraction of readers who think that a specific district is among the two districts that received the lowest investments, the black ones represent the respective fraction of readers

[9] We calculate the expected return on investment for each single positive investment decision of first movers. In cases where investments are zero, no meaningful values can be calculated. These observations are therefore neglected (7 percent of our observations contain investments equal to zero; in 91 percent of these cases expected back transfers are zero as well).

[10] Since first movers not only state their investment decision for each district but also their belief about the second mover's back transfer, we can also check whether first movers who do *not* discriminate, i.e., who send the same amount to all districts expect different back transfers from each district. We find that among those first movers who do not discriminate, 37 percent indicate varying beliefs, i.e., they expect district specific levels of trustworthiness. When we compare this belief based ranking with the one that results from the differences in investments (see Table 2) we find a positive and significant correlation (Spearman's Rho = 0.59; p = 0.041). This finding reinforces the systematics of discrimination across different districts.

[11] An alternative way to show the significance of the investment differences across districts is to simply regress the first mover investments on district dummies (robust standard errors, clustering on individuals). An F-Test shows that district differences are significantly different from zero ($p < 0.0001$).

concerning the two districts with the highest reputation. Districts are displayed on the horizontal axis, ordered according to the actual level of received investments. Figure 3 shows that the newspaper readers predicted the outcome of the experiment extremely well. For example, almost 70 percent think that district 4 is among the two districts receiving the lowest investments and about 50 percent think that this holds for districts 12 and 5, respectively. Almost nobody believes that districts 3 or higher (in terms of actually received investments) are among the two lowest districts. Likewise almost nobody believes that districts 3 or lower (in terms of investments) belong to the group of districts that are among the two districts that received the highest investments. The correlation between the rank order resulting from the answers of the newspaper readers and actual investment ranks is strong and highly significant. For answers concerning the two high investment districts the respective Spearman's rho is 0.89 ($p < 0.0001$) while for the two low districts it is -0.88 ($p < 0.001$). Thus the results from the newspaper study provide strong and independent evidence that districts in Zurich differ significantly and systematically in their perceived trustworthiness. In the next section we analyze potential reasons for these differences.

Result 2 (Determinants of trust discrimination) *Districts characterized by higher economic status and lower ethnic heterogeneity receive higher investments.*

In the social capital literature several factors that are associated with trust have been discussed. In this literature subjects from different regions within or across countries are asked about how willing they are to trust strangers. An important difference of this approach with respect to ours concerns the specification of the group that is supposed to be trusted. In the previous literature this group typically remains unspecified and it is not not entirely clear what group concept subjects have in mind when answering the trust question. In contrast, we explicitly fix the group and ask about trustworthiness of a stranger from a specific district of the city of Zurich. Moreover, we are interested in trust discrimination and elicit different levels of trust for different groups. In the following we check whether the factors that have been shown to be relevant for understanding trust in the previous literature also explain group specific trust, i.e., trust discrimination.

Some authors have pointed out a positive relation between economic and social status and trust or social capital (Alesina and La Ferrara, 2002; Knack and Keefer, 1997). Another important factor identified in the literature is ethnic and religious heterogeneity (Costa and Kahn, 2002; Alesina and La Ferrara, 2002). The negative correlation between heterogeneity and trust may reflect the fact that each ethnic and religious group is characterized by specific cultural and social norms. The more different norms and cultures are in

a district, the more difficult it is to build up social networks and trust. In a similar vein a high degree of mobility and low rates of home ownership have been shown to be negatively correlated with social capital (Glaeser et al., 2002; DiPasquale and Glaeser, 1999; Alesina and La Ferrara, 2002). Finally, it has been argued that members of rather 'hierarchical' religions (roman Catholics and Muslims) show relatively low levels of trust. In contrast to the rather liberal tradition of protestant churches, catholic and islamic churches are characterized by strong hierarchies and authorities making it more difficult to establish trust and social capital (La Porta et al., 1997; Knack and Keefer, 1997; Gabriel et al., 2002).

Table 4 shows how these variables are distributed across the 12 districts of Zurich. The data is provided by the statistical office of Zurich. Social and economic status is measured by the variables *income* and *high education*. Income is the taxable median income per district in 1000 Swiss Francs. High education measures the fraction of people who hold at least a "Matura" degree, an exam that comes at the end of university-track high school in Switzerland and is a prerequisite for attending university. Our measure of ethnic heterogeneity is the fraction of *foreigners* in a given district. As Column (4) in Table 4 shows, the variation in the fraction of foreigners is quite substantial ranging from 19 percent in district 7 to 44 percent in district 4. *Religious heterogeneity* is measured with a fragmentation index, i.e., 1 minus the sum of squared fractions of the following religious groups: protestant, catholic, muslim, jewish and other. We measure mobility with the variable *years of residency*, which shows how long people have lived in their respective district, on average. For example, while the average time lived in district 5 is 6.7 years, people in district 9 live 11.3 years in their district, on average. The variable *home ownership* shows the fraction of apartments owned by inhabitants. Finally, the variable *hierarchical religion* measures the fraction of people who are roman catholics.

The two rows at the bottom of Table 4 show how the district characteristics are correlated with the mean investments into the districts together with respective p-values of Spearman rank tests in brackets. All coefficients have the expected sign. The correlation for years of residency is insignificant, all others are significant at least at the 5-percent level. For example, the richer a district or the higher educated its inhabitants, the higher its reputation measured in terms of received investments. Likewise, the higher the degree of heterogeneity the lower the trust reputation.

Table 5 explores the determinants of trust discrimination in more detail. It shows OLS-regressions where the first mover investments are regressed on district specific characteristics. The dependent variable contains 12 investment decisions per first mover; robust standard errors (in brackets) allow for clustering at the individual level. Note that it makes little sense to run multivariate regressions, regressing investments on all district

characteristics simultaneously. The reason is that most of the characteristics are highly correlated and there are only 12 districts to identify the effects. For example, the correlation between income and fraction of foreigners is strong and highly significant (Spearman's rho=-0.84, $p < 0.001$). We therefore chose the following estimation strategy. We selected the two variables that are most strongly correlated with investments, income and fraction of foreigners, and show that they are highly significantly correlated with investments, even jointly (see Columns (1) to (3) of Table 5). In Columns (4) to (8) of Table 5 we include all other variables but only one at a time. It turns out that income and ethnic heterogeneity remain highly significant while all other variables are insignificant. The results therefore suggest that economic status and ethnic heterogeneity are important determinants of a district's trust reputation. Living in a district with a high economic status and a low level of ethnic heterogeneity implies receiving higher investments. Controlling for these two factors all other district characteristics are of less importance.

We now turn to the behavior of second movers. We first study whether second movers reciprocate the trust of first movers. In a second step we explore the nature of district specific discrimination and correlate trust and reciprocation at the district level.

Result 3 (Back transfers) *On average, second movers are reciprocal: the higher the first mover investments, the higher are the back transfers. Moreover, the level of the back transfers exceeds first movers' expectations.*

Support for Result 3 comes from Figure 4. It shows averages of expected and actual second mover back transfers for each possible first mover investment. The dark bars show the reciprocal repayment pattern of second movers. It is obvious from Figure 4 that higher investments are reciprocated with higher back transfers. Moreover, the extent of reciprocation is quite high. Compared to student populations where the returns on investment are often close to zero (see, e.g., Camerer (2003), p. 86, and the references therein), second movers from our non-student subjects pool reveal a relatively strong reciprocal inclination. For example, second movers are willing to send back about 35 Swiss Francs if they received 20 Francs. This means that they almost equalize final payments. Over the whole range of investments the slope between investment and pay backs estimated from a simple OLS-regression is about 1.6.

Figure 4 also shows that first movers expect reciprocation on the side of the second movers (grey bars). The more they invest, the more they expect to get back. They also expect to get back more than they invest. For example, those who send 20 Swiss Francs expect a back transfer of 27 Francs, on average.[12] Comparing expectations and actual

[12]This also suggests that high investments are made in the expectation of high back transfers and are not predominantly driven by the desire to be simply altruistic.

back transfers reveals that the average level of reciprocation is systematically higher than expected by first movers. In other words first movers generally underestimate the amount of reciprocation that is prevalent in the population of Zurich.

Turning to second mover behavior on a district level, we now check whether reciprocation varies across districts and, in particular, whether there is a correlation between investments and the level of reciprocation:

Result 4 (Statistical discrimination) *Different levels of investment into districts as well as expected returns on investment are both significantly correlated with respective back transfers. This indicates that first movers' investment decisions are at least in part motivated by statistical discrimination and not just by mistaken stereotypes.*

We know already that investments into districts correspond to different levels of expected returns on investment (see Table 2). In this sense we can already say that investments are not purely taste driven but actually reflect different levels of expected trustworthiness. In this section we go one step further, however, and ask whether investments and expected returns are actually correlated with back transfers. In other words we investigate whether the observed different expectations merely represent mistaken stereotypes or whether they are actually justified in terms of different levels of trustworthiness.

In order to assess a district's trustworthiness we aggregate people's back transfers in a given district. In order to so, we cannot only use those back transfers that were actually executed and paid, because even if reciprocal inclinations across districts would be identical, we would find that districts that receive high investments return more than districts that receive low investments. Instead we use data from the contingent response method, which informs us about willingness to reciprocate independent of actual investments. In a first step, we calculate for each subject the relation between investment and back transfer: running simple OLS regressions of back transfer on investment and forcing the slope through the origin we get an estimate of a subject's reciprocal inclination.[13] The higher the estimated coefficient the more sensitive is a second mover's reaction to varying levels of investments. In a next step, we calculate the averages of these slope for every district. The resulting variation is quite substantial and ranges from about 1.4 to about 2.

Figure 5 displays how these district averages are associated with average investments into the respective districts. The numbered dots represent the 12 districts, the dashed line is a weighted linear trend. Figure 5 shows that investments and back transfers are positively and significantly correlated on a district level (Spearman's rho = 0.67, p

[13]We also estimated reciprocal inclinations using individuals' average back transfers for all possible investments. Qualitatively this yields the same result.

< 0.02). Moreover, mean trustworthiness of districts is also correlated with expected return on ivestment (see third row of Table 2). The respective Spearman rank correlation between expected return on investment and average level of reciprocation on a district level is 0.7113 ($p < 0.01$). This brings us full circle: first movers hold particular beliefs about the trustworthiness of different districts, which determine their trusting decisions. These beliefs correspond on average with actual trustworthiness.

3.2 In-group Favoritism

A particular form of discrimination is in-group favoritism, i.e., the tendency to favor strangers who belong to one's own group. While the relevance of in-group favoritism is well established for simple allocation tasks (see Yamagishi et al., 1999), the literature is yet quite inconclusive about the existence, importance and determinants of in-group favoritism in the context of trust decisions. In trust experiments conducted on the basis of the minimal group paradigm the evidence in favor of an in-group bias is weak. Buchan et al. (forthcoming) and Güth et al. (2005) conducted trust games within and across minimal groups. While Buchan et al. (forthcoming) find some in-group favoritism in trust for American students but not for Chinese students, Güth et al. (2005) don't find any indication of an in-group bias at all. Similarly, studies based on naturally defined groups provide rather mixed evidence. The discrimination pattern identified in Fershtman and Gneezy (2001) is not a consequence of an ingroup bias. Both, Ashkenazic and Eastern males invest less money if their opponent is an Ashkenazic male. In their trust game study among Harvard undergraduates Glaeser et al. (2000) find that in pairs with participants from different countries or races trust and trustworthiness are lower, but the effect is only of statistical significance for the latter. Bouckaert and Dhaene (2004) report results from trust games with small businessmen of Turkish or Belgian origin in the city of Ghent. Their data does not contain any evidence for the existence of ethnic discrimination or in-group favoritism. Haile et al. (2006) conducted trust experiments with students from two South African Universities. While they do not find evidence for in-group favoritism in total, they observe that low income subjects of both races trust high income subjects from the other race significantly less. Two exceptions that provide evidence in favor of ingroup-favoritism are Bernhard et al. (2006) and Götte et al. (2006). The former is an experiment with two non-hostile clans in Papua New Guinea. First movers in a trust game transfer significantly more to members of their own clan. The latter reports results from experiments with officer candidates in the Swiss Army. Subjects show higher levels of cooperation in a simultaneous prisoner's dilemma when they interact with a member of their own platoon.

Our field experiment offers an ideal set-up to study in-group favoritism in a natural environment. Since first movers make investments for each possible residential district of the second mover, including their own district, we can assess the extent of in-group favoritism by comparing investments into own district relative to other districts.

Result 5 (In-group favoritism) *We observe a pronounced in-group bias in trust. First movers invest significantly higher amounts into their own districts compared to other districts.*

Result 5 is supported by the fact that 11 out of the 12 districts invest more to their own district than they invest on average to the other districts. Finding this outcome in the absence of in-group favoritism is very unlikely (Binomial test, $p < 0.01$). In Table 6 we explore the nature of in-group favoritism in more detail. In the first column we regress first movers' investments on a dummy for own district, which takes value 1 if the particular investment is meant for the own district and 0 otherwise. The coefficient is positive and highly significant, revealing that first movers systematically favor their own district over other districts. On average they invest 1.40 Swiss Francs more into their own district, which is about 10 percent more than they send on average into the other districts.

It turns out that the observed in-group favoritism in trust is in part driven by different expectations about trustworthiness. In Column (2) we regress expected back transfers on the own district dummy. In addition we control for investments. The dummy coefficient is positive and highly significant, suggesting that in-group favoritism is partly explained by different expected levels of trustworthiness: for a given investment, subjects believe that back transfers are 1.08 Francs higher if they interact with strangers from their own district compared to interactions with strangers from other districts. Put differently, people believe that fellow citizens from their own district are more trustworthy than the average citizen, which means that in-group favoritism does not just reflect a particular taste to favor members of one's own group.

3.3 Individual Determinants of Discrimination and In-group Favoritism

Little is known about individual determinants of discrimination and in-group favoritism. Due to a lack of appropriate behavioral data and insufficient variation in personal characteristics of student subject pools, previous work has mainly focused on establishing average effects. In this last results section we combine behavioral data from the contingent re-

sponse method with individual background data, and explore individual determinants of discrimination and in-group favoritism.

We first examine personal characteristics of people who discriminate in our trust experiment. Overall, 55 percent of the first movers differentiate their investments, while 45 percent send the same amount into each district. Those who discriminate are significantly less trusting than those who don't. Discriminators send on average CHF 9.47, which is significantly less than the amount sent by those who don't discriminate (CHF 17.65). In columns (1) to (3) of Table 8 we estimate Probit models, where the dependent variable is an indicator variable, which takes value one if the respective first mover has discriminated and zero otherwise. All estimation results are based on robust standard errors. In the first column we regress the indicator variable on a non-linear specification for age, gender and whether the first mover is an only child. We find no gender and only child effects but a strong age effect. Older people are more likely to discriminate than younger people. In Columns (2) and (3) we add individual characteristics that are influenced by a person's choices in life. These variables are potentially endogenous and therefore not easy to interpret in a causal way. Column (2) includes variables on income, education, marital status, the number of children, and whether the first mover is a foreigner. In Column (3) we add ideological, religious and attitudinal variables. We find that education and having children reduces the amount of discrimination, while those who classify themselves politically as right-wingers tend to discriminate more. Interestingly, discrimination is neither associated with the time a first mover has lived in Zurich or in his district nor with how associated he feels to Zurich or his district, respectively.

In Columns (4), (5) and (6) of Table 8 we study individual characteristics that potentially explain in-group favoritism. We report OLS-estimates where the dependent variable is the individual in-group bias, i.e., the difference between a first mover's investment into his own district and his average investment into the other districts. In Column (4) the explanatory variables are age dummies and two dummies for gender and only child. None of the coefficients is significant. We add further explanatory variables in Columns (5) and (6), analogously to Columns (2) and (3). Again, none of the variables is significant, with one exception: first movers who feel closely associated to their own district display significantly stronger in-group favoritism.[14]

These results suggest that in-group favoritism in terms of trust is not a particular gender or age specific phenomenon. Moreover, family, religious or political background

[14]The exact wording of the question, which we asked in the questionnaire reads as "How strongly associated do you feel with your city district?" Answers could be given on a five point scale, ranging from 'not at all' to 'very strongly'. We constructed a dummy, which takes value one if a subject answers the question with 'very strongly' and zero otherwise.

don't seem to matter. What does matter – quite intuitively – is the nature of the relationship with the particular in-group. People who identify with their group and state that they feel associated favor in-group members over members from other groups, even in anonymous interactions.

4 Concluding remarks

In this paper we study prevalence and determinants of discrimination, in-group favoritism and trust and reciprocity across different districts of Zurich. Many people discriminate and trust strangers from different districts differently. Given that Zurich is a relatively homogenous city, in comparison with many other cities, it is quite striking to find discrimination even here. We speculate that discrimination is even more pronounced in more heterogenous cities or regions. Our data reveal that first movers hold particular beliefs about the trustworthiness of different districts, which are associated with their trusting decisions. These beliefs correspond on average with actual trustworthiness. This is a strong result. It implies that first movers know quite a lot about their city and use this information to determine their decisions. As a consequence, first movers invest more into districts that are actually characterized by higher levels of trustworthiness. In this sense, we can interpret the observed discrimination pattern, at least in part, in terms of statistical discrimination. Rather than being only driven by taste or prejudice, many people in the city of Zurich discriminate on the basis of their relatively accurate beliefs. We also find strong support for the existence of in-group favoritism in trust. Citizens of Zurich tend to favor strangers from their own district, in part because they expect them to be more trustworthy than strangers from other districts.

The fact that people discriminate between strangers from different districts can have important economic and social consequences, not only for an individual living in a particular district but also for districts as a whole. On an individual level it is relevant insofar as many economically relevant transactions involve some element of trust. In the hiring process, e.g., two otherwise equal applicants may be treated differently simply because they come from different parts of the city. On the level of districts, trust discrimination may foster the process of segregation. The Zurich case shows that districts with a relatively high socio-economic status are also those, which enjoy the highest reputation of being trustworthy. Since this reputation favors investments there is an endogenous tendency to reinforce inner city inequalities. Relatively richer districts are trusted more and therefore become even richer. This process is reinforced by housing rents and moving decisions. Those who can afford it will move to high reputation districts, again increasing

district inequalities.

Our results are also relevant from a city development point of view. The study demonstrates that policy makers can use field experiments to identify the reputation of different neighborhoods in a way that is relevant for the citizens of the respective city or region. Running similar experiments could help identify problem areas in a cheap and reliable way. It also helps providing potential indicators for future district development, which allows targeting appropriate policies to specific districts.

References

Alesina, A. and La Ferrara, E. (2002). Who trusts others?, *Journal of Public Economics* **85**(2): 207–34.

Arrow, K. J. (1972). Gifts and exchange, *Philosophy and Public Affairs* **1**: 343–367.

Berg, J., Dickhaut, J. W. and McCabe, K. A. (1995). Trust, reciprocity, and social history, *Games and Economic Behavior* **10**(1): 122–42.

Bernhard, H., Fehr, E. and Fischbacher, U. (2006). Group affiliation, trust and social preferences, *Mimeo, University of Zurich* .

Bouckaert, J. and Dhaene, G. (2004). Inter-ethnic trust and reciprocity: Results of an experiment with small businessmen, *European Journal of Political Economy* **20**(4): 869–86.

Brandts, J. and Charness, G. (2000). Hot and cold decisions and reciprocity in experiments with sequential games, *Experimental Economics* **2**: 227–238.

Buchan, N., Johnson, E. and Croson, R. (forthcoming). Lets get personal: An international examination of the influence of communication, culture, and social distance on other-regarding preferences, *Journal of Economic Behavior and Organization* .

Camerer, C. F. (2003). Behavioral game theory: Experiments in strategic interaction, pp. xv, 550.

Cason, T. and Mui, V.-L. (1998). Social influence in the sequential dictator game, *Journal of Mathematical Psychology* **42**: 248–465.

Coleman, J. S. (1990). *Foundations of social theory*, Harvard University Press, Cambridge, Mass.

Costa, D. L. and Kahn, M. E. (2002). Changes in the value of life: 1940-1980, *Working Paper* .

DiPasquale, D. and Glaeser, E. L. (1999). Incentives and social capital: Are homeowners better citizens?, *Journal of Urban Economics* **45**(2): 354–84.

Fershtman, C. and Gneezy, U. (2001). Discrimination in a segmented society: An experimental approach, *Quarterly Journal of Economics* **116**(1): 351–77.

Gabriel, O. W., Kunz, V., Rossteutscher, S. and Deth, J. W. v. D. (2002). *Sozialkapital und Demokratie. Zivilgesellschaftliche Ressourcen im Vergleich*, WUV Universitätsverlag, Vienna.

Glaeser, E. L., Laibson, D. I., Scheinkman, J. A. and Soutter, C. L. (2000). Measuring trust, *Quarterly Journal of Economics* **115**(3): 811–46.

Glaeser, E. L., Laibson, D. and Sacerdote, B. (2002). An economic approach to social capital, *Economic Journal* **112**(483): F437–58.

Götte, L., Huffman, D. and Meier, S. (2006). The impact of group membership on cooperation and norm enforcement: Evidence using random assignment to real social groups, *American Economic Review (Papers and Proceedings)* **96**(2): 212–16.

Guiso, L., Sapienza, P. and Zingales, L. (2004). The role of social capital in financial development, *American Economic Review* **94**(3): 526–56.

Güth, W., Huck, S. and Mueller, W. (2001). The relevance of equal splits in ultimatum games, *Games and Economic Behavior* **37**: 161–169.

Güth, W., Levati, V. and Ploner, M. (2005). The effect of group identity in an investment game, *Working Paper* .

Haile, D., Sadrieh, A. and Verbon, H. A. A. (2006). Cross-racial envy and underinvestment in south africa, *CESifo Working Paper No. 1657* .

Knack, S. and Keefer, P. (1997). Does social capital have an economic payoff? a cross-country investigation, *Quarterly Journal of Economics* **112**(4): 1251–88.

Knack, S. and Zak, P. J. (2001). Trust and growth, *Economic Journal* **111**(470): 295–321.

La Porta, R. L., Lopez-de Silane, F., Shleifer, A. and Vishny, R. W. (1997). Trust in large organizations, *American Economic Review* **87**(2): 333–38.

Loury, G. C. (1977). A dynamic theory of racial income differences, *in* P. Wallace and A. M. La Mond (eds), *Women, Minorities, and Employment Discrimination*, Heath, Lexington, MA, pp. 115–136.

Putnam, R. D. (2000). *Bowling Alone : The Collapse and Revival of American Community*, Simon and Schuster, New York.

Putnam, R. D., Leonardi, R. and Nanetti, R. Y. (1993). *Making Democracy Work: Civic Traditions in Modern Italy*, Princeton University Press, Princeton, N.J.

Sherif, M., Harvey, O. J., White, B. J., Hood, W. R. and Sherif, C. W. (1961). *Intergroup Conflict and Cooperation: The Robber's Cave Experiment*, Norman: University of Oklahoma Book Exchange.

Yamagishi, T., Jin, N. and Kiyonari, T. (1999). Bounded generalized reciprocity: Ingroup boasting and ingroup favoritism, *in* S. R. Thye, L. E. J., M. W. Macy and H. A. Walker (eds), *Advances in Group Processes, Volume 16*, Jai Press Inc., pp. 161–97.

Figure 1: Map of Zurich as distributed to participants

Figure 2: Histogram of first mover investments

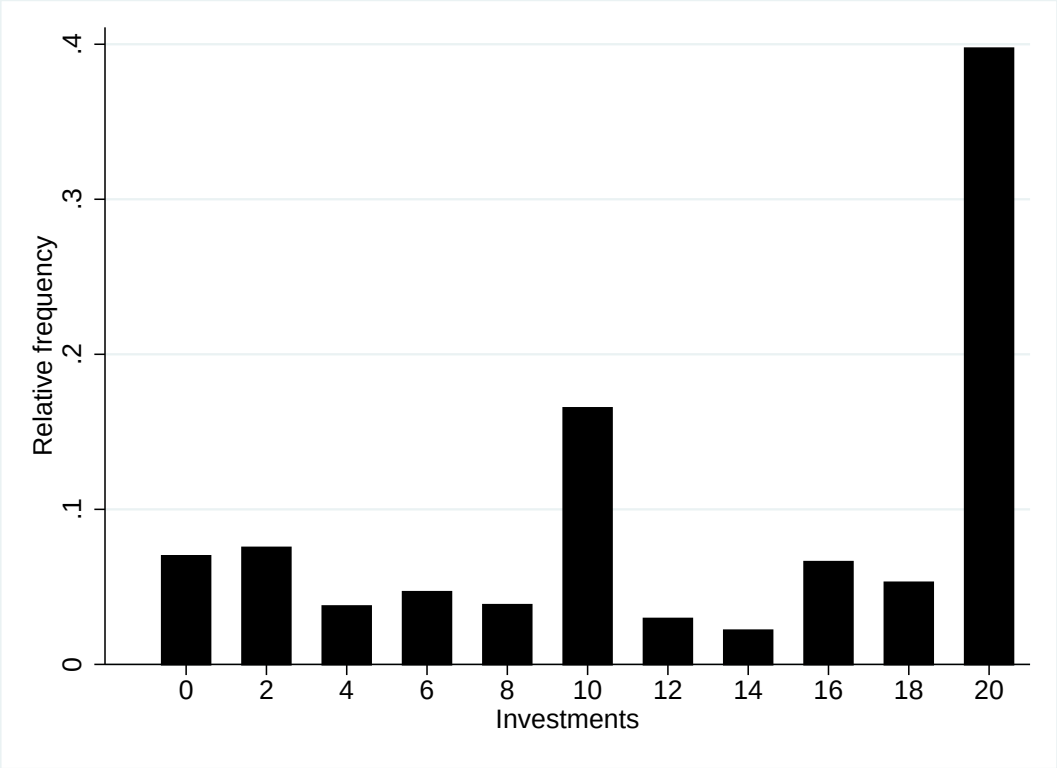


Figure 3: Answers of newspaper readers

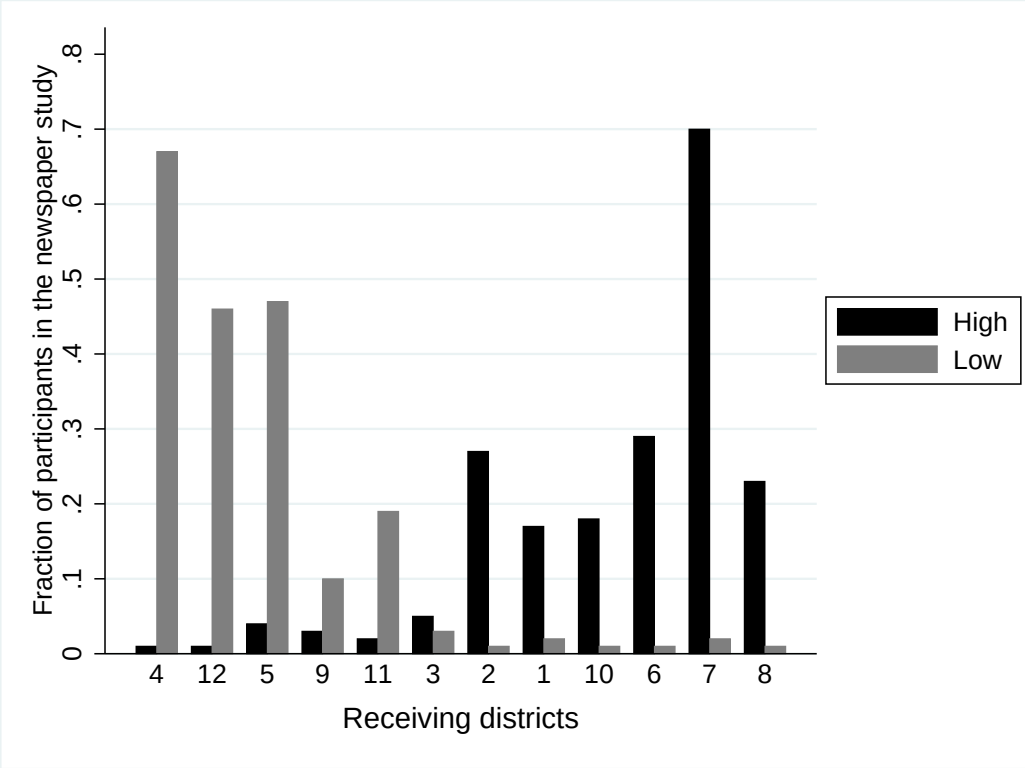


Figure 4: Actual and expected second mover back transfers

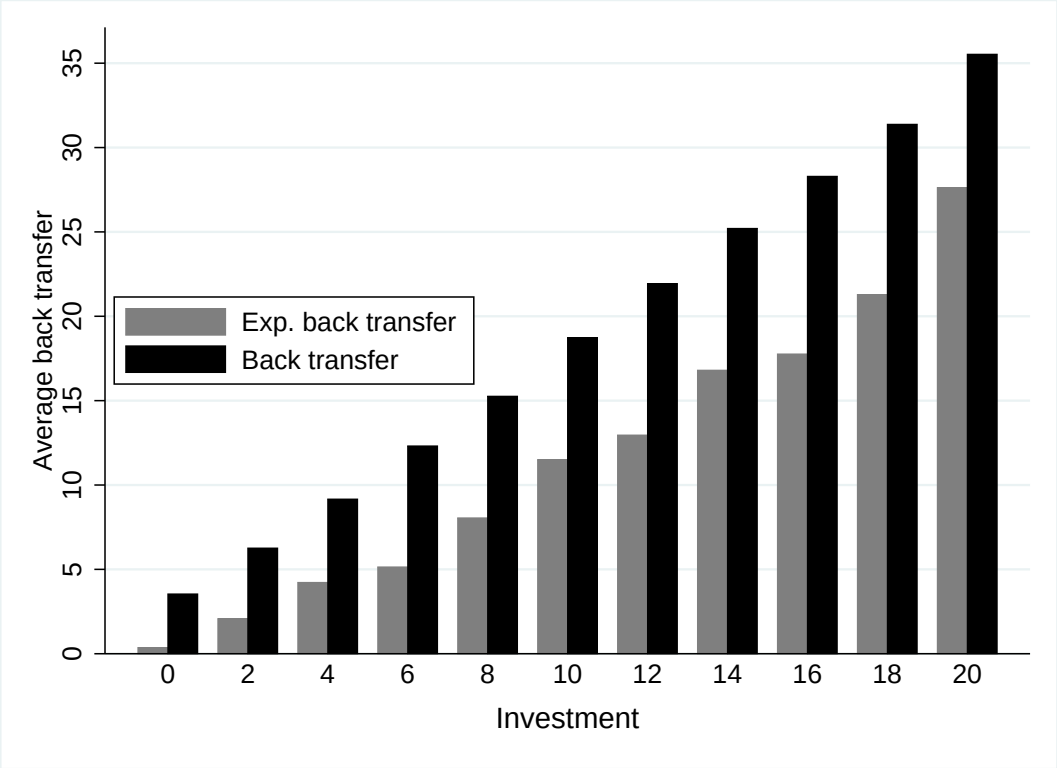
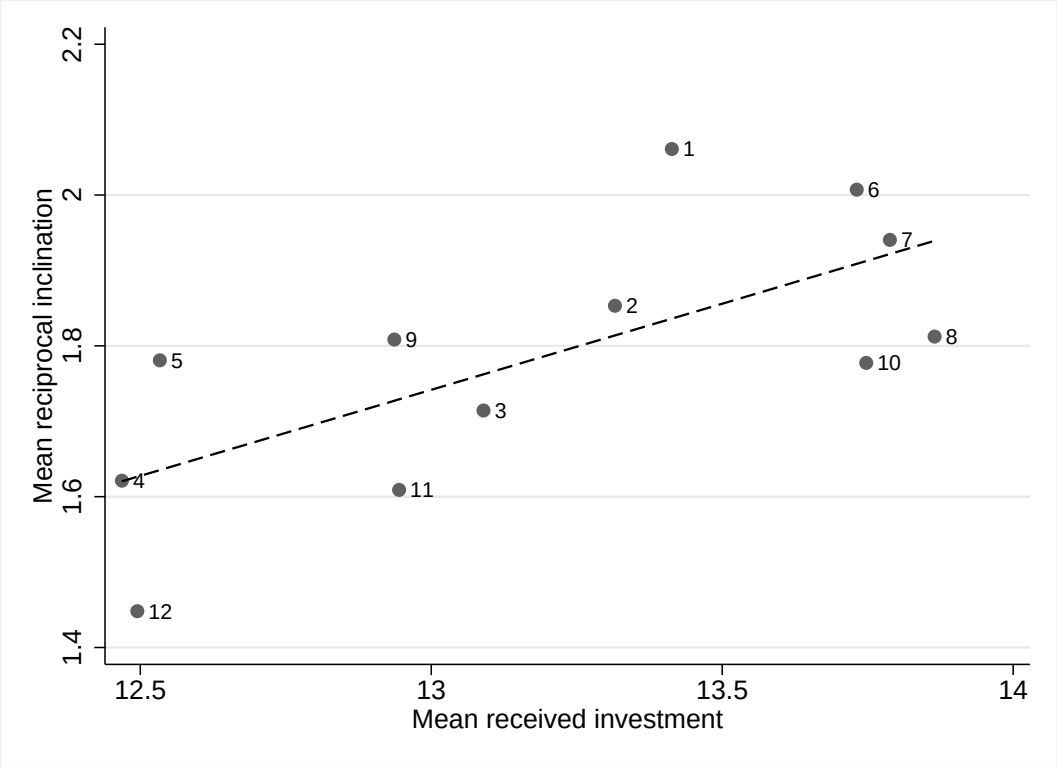


Figure 5: Correlation of investments and reciprocal inclination



Notes: Each numbered dot in the figure corresponds to one of Zurich's districts. The line represents the predicted values for the mean reciprocal inclination based on a linear regression of mean reciprocal inclination on mean received investments.

Table 1: Decision table for first movers

Suppose the other person lives in district	How much of your CHF 20 do you invest?	How much do you expect to get back?
1		
2		
...		
12		

Table 2: Average investment into districts and expected back transfers

Into district	1	2	3	4	5	6
Investment	13.41	13.30	13.04	12.44	12.50	13.72
Expected back transfer	18.22	17.43	16.73	15.12	15.26	18.15
Expected return on investment[1]	0.30	0.23	0.24	0.15	0.15	0.24

Into district	7	8	9	10	11	12
Investment	13.74	13.83	12.90	13.68	12.91	12.45
Expected back transfer	17.87	18.17	16.07	17.63	15.96	15.07
Expected return on investment[1]	0.25	0.25	0.19	0.23	0.17	0.16

[1] We calculate the expected return on investment $\left(= \frac{\text{expected back transfer}}{\text{investment}} - 1\right)$ for each single positive investment decision of first movers. Note that in cases where investments are zero, no meaningful values can be calculated. These observations are therefore neglected (7 percent of our observations contain investments equal to zero; in 91 percent of these cases expected back transfers are zero as well).

Table 3: Pair-wise comparison of investments into districts

Districts	12	5	9	11	3	2	1	10	6	7	8
4	0.99	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12		0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5			0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9				0.86	0.20	0.00	0.01	0.00	0.00	0.00	0.00
11					0.10	0.00	0.01	0.00	0.00	0.00	0.00
3						0.03	0.10	0.00	0.00	0.00	0.00
2							0.80	0.01	0.00	0.00	0.00
1								0.17	0.00	0.01	0.03
10									0.57	0.22	0.65
6										0.43	0.53
7											0.89

Notes: The table reports p-values of pair-wise Wilcoxon-signed-rank tests. The units of observation are individual first mover investments. Districts are ordered by received investments such that districts with similar received investment are located close to each other.

Table 4: District characteristics

District	Income[1]	High education[2]	Foreigners[3]	Religious heterogeneity[4]	Years of residency[5]	Home ownership[6]	Catholics[7]
1	39	0.48	0.22	0.68	8.1	0.09	0.27
2	40	0.33	0.23	0.72	10.9	0.06	0.31
3	35	0.26	0.33	0.72	9.4	0.04	0.33
4	30	0.25	0.44	0.71	7.7	0.04	0.36
5	36	0.30	0.39	0.71	6.7	0.06	0.32
6	40	0.44	0.23	0.69	9.9	0.06	0.32
7	44	0.47	0.19	0.68	10.8	0.13	0.28
8	42	0.44	0.25	0.69	10.0	0.08	0.31
9	36	0.19	0.33	0.70	11.3	0.05	0.37
10	40	0.33	0.25	0.70	10.3	0.09	0.32
11	36	0.24	0.33	0.71	9.4	0.06	0.35
12	31	0.15	0.35	0.71	11.0	0.04	0.34
Spearm. Rho[8]	0.92	0.83	-0.85	-0.65	0.18	0.74	-0.75
	[0.000]	[0.001]	[0.000]	[0.022]	[0.572]	[0.006]	[0.005]

Notes: Source: Statistical Office of Zurich and Statistical Yearbook of the City of Zurich (2003)
[1] median per capita income in 1000 Swiss Francs (data for unmarried persons only)
[2] population fraction with at least a "matura" degree (prerequisite for attending university)
[3] population fraction of foreigners
[4] fragmentation index = 1 - sum of squared population fractions of all religions
[5] average number of years with residency in the same district per person
[6] fraction of apartments owned by inhabitants
[7] population fraction of Catholics
[8] Spearman's Rho for the correlation of first mover investments and the variable (p-values in brackets)

Table 5: Determinants of received investments at the district level

Dependent variable	Received investment							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Income	0.113***		0.063***	0.051***	0.058***	0.063***	0.082***	0.065***
	[0.017]		[0.018]	[0.020]	[0.018]	[0.018]	[0.021]	[0.018]
Foreigners		-6.239***	-3.150***	-2.954**	-2.803**	-3.129**	-3.197***	-3.694***
		[0.952]	[1.134]	[1.168]	[1.168]	[1.253]	[1.135]	[1.281]
High education				0.677				
				[0.747]				
Religious heterogeneity					4.252			
					[3.691]			
Years of residency						0.001		
						[0.038]		
Home ownership							-3.869	
							[2.485]	
Roman catholics								2.268
								[2.285]
Constant	8.928***	14.981***	11.740***	11.889***	10.547***	11.716***	11.263***	11.085***
	[0.616]	[0.280]	[0.892]	[0.881]	[1.432]	[1.155]	[0.926]	[1.081]
Individual fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Observations	6087	6087	6087	6087	6087	6087	6087	6087
R-squared	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85

Notes: OLS-estimation with robust standard errors clustered on individuals in brackets. The dependent variable contains 12 investment decisions per first mover (one for each district). Details on the independent variables are found in Table 4. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6: First mover's in-group bias

Dependent variable	Investment	Exp. back transfer
	(1)	(2)
Own district	1.396***	1.076***
	[0.160]	[0.247]
First mover's investment		1.097***
		[0.067]
Constant	13.032***	2.294***
	[0.013]	[0.872]
Individual fixed effects	YES	YES
Observations	6087	6086
R-squared	0.85	0.89

Notes: OLS-estimations with robust standard errors clustered on individuals in brackets. The dependent variables contain 12 observations (investments resp. expected back transfers) per first mover (one for each district). * significant at 10%; ** significant at 5%; *** significant at 1%. We lose one observation in Column (2) due to a non-response.

Table 7: Definitions of variables (personal chararacteristics)

Age X-Y	Dummy variable that takes on the value 1 if the person is in the age range X to Y and 0 otherwise.
Female	Dummy variable that takes on the value 1 if the person is female and 0 otherwise.
Only Child	Dummy variable that takes on the value 1 if the person does not have siblings.
Tax Income	Taxable income as reported to the tax authorities of Zurich (in 10'000 Swiss Francs). As married couples only report their combined income to the authorities, we divide the reported value by 2 in case of married people.
High skilled	Dummy variable that takes on the value 1 if the person has a ISCO skill level of 4 and 0 otherwise. The International Standard Classification of Occupations (ISCO-88) organizes occupations in an hierarchical framework and assigns a skill level (1 (elementary occupations) to 4 (professionals)) to each occupation.
Married	Dummy variable that takes on the value 1 if the person is married and 0 otherwise.
Children	Number of children of the person
Foreigner	Dummy variable that takes on the value 1 if the person is not a Swiss citizen and 0 otherwise.
Years of residency in city	Number of years that the person has lived in the city of Zurich.
Associated with city	Dummy variable that indicates whether the person feels strongly associated with the city of Zurich; originally measured on a four-point scale from 1 (not at all) to 4 (very strongly). The dummy takes on the value 1 if the person has ticked "very strongly" and 0 otherwise.
Years of residency in district	Number of years that the person has lived in the current district of residency.
Associated with own district	Dummy variable that indicates whether the person feels strongly associated with her district of residency; originally measured on a four-point scale from 1 (not at all) to 4 (very strongly). The dummy takes on the value 1 if the person has ticked "very strongly" and 0 otherwise.
Rightwinger	Dummy variable that indicates whether the person conceives herself as a rightwinger; originally measured on a five-point scale from 1 (leftwing) to 5 (rightwing). The dummy takes on the value 1 if the person has ticked "rightwing" and 0 otherwise.
Leftwinger	Dummy variable that indicates whether the person conceives herself as a leftwinger; originally measured on a five-point scale from 1 (leftwing) to 5 (rightwing). The dummy takes on the value 1 if the person has ticked "leftwing" and 0 otherwise.
Catholic	Dummy variable that takes on the value 1 if the person is a roman Catholic and 0 otherwise.
Protestant	Dummy variable that takes on the value 1 if the person is a Protestant and 0 otherwise.
Other religion	Dummy variable that takes on the value 1 if the person reports a confession other than Catholic or Protestant (but not no confession) and 0 otherwise.

Table 8: Individual determinants of discrimination and in-group favoritism

Dependent variable	Discrimination			In-group Bias		
	(1)	(2)	(3)	(4)	(5)	(6)
Age 31-45	-0.027	0.049	0.051	-0.774	-0.722	-0.647
	[0.168]	[0.181]	[0.190]	[0.480]	[0.512]	[0.527]
Age 46-60	0.175	0.213	0.291	-0.593	-0.601	-0.561
	[0.188]	[0.201]	[0.220]	[0.538]	[0.570]	[0.612]
Age 61-75	0.691***	0.568**	0.551*	0.298	0.327	0.285
	[0.219]	[0.246]	[0.289]	[0.606]	[0.672]	[0.795]
Age 76 and older	0.955***	0.727**	0.752*	0.509	0.392	0.13
	[0.300]	[0.359]	[0.428]	[0.767]	[0.938]	[1.123]
Female	0.05	0.041	0.021	0.136	0.109	0.047
	[0.125]	[0.133]	[0.138]	[0.353]	[0.374]	[0.380]
Only child	0.113	0.027	-0.02	0.344	0.614	0.573
	[0.182]	[0.192]	[0.195]	[0.516]	[0.538]	[0.548]
Tax Income		0.001	-0.01		0.026	0.034
		[0.016]	[0.017]		[0.047]	[0.050]
High skilled		-0.362***	-0.327**		-0.35	-0.391
		[0.125]	[0.128]		[0.352]	[0.358]
Married		0.042	0.035		-0.052	-0.02
		[0.150]	[0.153]		[0.416]	[0.422]
Children		-0.148*	-0.151*		-0.047	-0.11
		[0.083]	[0.083]		[0.224]	[0.228]
Foreigner		0.249	0.257		0.183	0.295
		[0.228]	[0.234]		[0.632]	[0.651]
Years of residency in city			0.003			0.008
			[0.006]			[0.015]
Associated with city			0.124			0.255
			[0.136]			[0.381]
Years of residency in district			-0.003			-0.007
			[0.007]			[0.018]
Associated with own district			0.086			1.433***
			[0.182]			[0.519]
Rightwinger			0.822**			-0.226
			[0.392]			[0.973]
Leftwinger			-0.211			0.137
			[0.162]			[0.447]
Catholic			0.087			-0.242
			[0.198]			[0.545]
Protestant			-0.303			-0.597
			[0.190]			[0.529]
Other religion			-0.161			-0.38
			[0.217]			[0.600]
Constant	-0.116	0.019	0.092	1.713***	1.771***	1.712**
	[0.154]	[0.178]	[0.251]	[0.441]	[0.507]	[0.690]
Observations	491	470	467	491	470	467
R-squared				0.02	0.02	0.05

Notes: Columns (1) to (3): Probit estimations with robust standard errors in brackets. The dependent variable is an indicator variable that takes the value 1 if the first mover has discriminated and 0 otherwise. Columns (4) to (6): OLS-estimations with robust standard errors clustered on individuals in brackets. The dependent variable is the difference between a first mover's investment into his own district and his average investment into other districts. Details on the independent variables in all regressions of this table are found in Table 7. * significant at 10%; ** significant at 5%; *** significant at 1%. We lose observations in Columns (2), (3), (5) and (6) due to non-responses.